

Neutrino Interaction ID

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◆ *MC event generation*

1. Produce mc file (~ 2000 events) with ν_μ , ν_e , ν_τ CC interactions at the fourth (third, second ,first) target station for all four periods (when that exist).
2. Repeat for NC interactions.

◆ *MC daft file offline analysis*

Study various parameters that will enable us, by using Artificial Neural Network(ANN) techniques (described below), to find a set of criteria with which we will distinguish electrons, muons, and pions, gammas, and subsequently ν_μ , ν_e , ν_τ interactions . Examples of such parameters:

EMCAL

- a) Number of hits in the calorimeter
- b) Number of clusters in the calorimeter
- c) Cluster energy
- d) Total energy deposited in the calorimeter
- e) No. of Clusters with/with no associated track

MID

- a) No. of hits vs plane #
- b) Tacks with/without hits at the MID

DC's

- a) Number of hits in each plane of the DC's
- b) Number of hits in all DC planes
- b) Number of hits in DC planes after subtracting track hits

SF'

- a) Number of hits in each SF plane
- b) Number of hits in all SF planes
- c) Energy deposition in the target are (This needs much work)

◆ *Neural-network techniques*

Input parameters: Listed above

Use MC events to train a neural-network so as to define which form the above parameters and with what weight should be used in our data analysis in order to distinguish electrons, muons, gammas and pions.

Verify: with MC events

ANN layers: 3-4

Output parameters: ID probabilities

Technique: Backpropagation algorithm

NOTE: ANN can be usefull in other topics too!